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Applicant(s): Miller

Serial No: Unknown

Filed: Herewith

Examiner: Unknown

Title: ELECTROMECHANICAL VALVE ASSEMBLY FOR AN INTERNAL  
COMBUSTION ENGINE

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Angela Singleton  
Signature Angela Singleton

Assistant Commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT FOR DIVISIONAL APPLICATION

Sir:

Please enter the following preliminary amendment in the  
above-identified divisional patent application from the parent  
U.S. Patent Application No. 09/732,282, filed 12/07/00.

IN THE CLAIMS:

Please cancel claims 1-21 and add new claims 22-33 as follows:

22. A method for current recirculation in first and second electromechanical valves assemblies disposed in an internal combustion engine, said first electromechanical valve assembly having first and second stator phases selectively connected between a first node and ground, said second electromechanical valve assembly having third and fourth stator phases selectively connected between said first node and ground, said method comprising:

generating a braking current in said first and second stator phases of said first electromechanical valve assembly; and,

connecting said third and fourth stator phases of said second electromechanical valve assembly to said first node to direct said braking current into said third and fourth stator phases as an accelerating current.

23. The method of claim 22 wherein said first electromechanical valve assembly includes an exhaust valve controlling fluid communication through a line connected with a cylinder of said engine.

24. The method of claim 23 wherein said braking current is generated when moving said exhaust valve in said first electromechanical valve assembly toward a closed position.

25. The method of claim 22 wherein said second electromechanical valve assembly includes an intake valve controlling fluid communication through a line connected with a cylinder of said engine.

26. The method of claim 25 wherein said accelerating current is utilized to move said intake valve in said second electromechanical valve assembly toward an open position.

27. A method for current recirculation in first and second electromechanical valves assemblies disposed in an internal combustion engine, said first electromechanical valve assembly having first and second stator phases selectively connected between a first node and ground, said second electromechanical valve assembly having third and fourth stator phases selectively connected between said first node and ground, said method comprising:

generating a braking current in said first and second stator phases of said first electromechanical valve assembly to slow down movement of an exhaust valve in said first electromechanical valve assembly toward a closed position; and,

connecting said third and fourth stator phases of said second electromechanical valve assembly to said first node to direct said braking current into said third and fourth stator phases as an accelerating current to move an intake valve in said second electromechanical valve assembly toward an open position.

28. A system for controlling current recirculation in first and second electromechanical valves assemblies disposed in an internal combustion engine, said first electromechanical valve assembly having first and second stator phases selectively connected between a first node and ground, said second electromechanical valve assembly having third and fourth stator phases selectively connected between said first node and ground, said system comprising:

a first commutation circuit that controls current flow in said first and second stator phases of said first electromechanical valve assembly;

a second commutation circuit that controls current flow in said third and fourth stator phases of said second electromechanical valve assembly; and,

a valve controller operably connected to said first and second commutation circuits, said controller configured to connect said third and fourth stator phases of said second electromechanical valve assembly to said first node to direct a braking current generated in said first and second stator phases into said third and fourth stator phases as an accelerating current.

29. The system of claim 28 wherein said first electromechanical valve assembly includes an exhaust valve controlling fluid communication through a line connected with a cylinder of said engine.

30. The system of claim 29 wherein said braking current is generated when said exhaust valve in said first electromechanical valve assembly is moving toward a closed position.

31. The system of claim 28 wherein said second electromechanical valve assembly includes an intake valve controlling fluid communication through a line connected with a cylinder of said engine.

32. The system of claim 31 wherein said accelerating current is generated to move said intake valve in said second electromechanical valve assembly toward an open position.

33. An article of manufacture, comprising:

a computer storage medium having a computer program encoded therein for controlling current recirculation in first and second electromechanical valves assemblies disposed in an internal combustion engine, said first electromechanical valve assembly having first and second stator phases selectively connected between a first node and ground, said second electromechanical valve assembly having third and fourth stator phases selectively connected between said first node and ground, said computer storage medium comprising:

code for generating a braking current in said first and second stator phases of said first electromechanical valve assembly; and,

code for connecting said third and fourth stator phases of said second electromechanical valve assembly to said first node to direct said braking current into said third and fourth stator phases as an accelerating current.

R E M A R K S


Applicant is filing this divisional patent application from parent U.S. Patent Application No. 09/732,282. Applicant has cancelled original claims 1-21 and has added new claims 22-33. Support for claims 22-35 may be found on pages 25-26 of the specification, drawings, and original claims 19-21.

In the parent U.S. Patent Application No. 09/732,282, The Examiner made a restriction between Group I including claims 1-18 and Group 2 including claims 19-21. Applicant is prosecuting the claims of Group I in the parent application.

The present divisional patent application is directed to the invention identified by original claims 19-21. In particular, the Applicants have cancelled original claims 19-21 and have submitted new claims 22-33 which are directed to the same invention to more clearly claim the invention.

Please charge any cost incurred in the filing of this Amendment, with any other costs, to Deposit Account 06-1510. If there are insufficient funds in this account, please charge the fees to Deposit Account No. 06-1500.

Respectfully submitted,

  
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